

3.7 Solving Problems with Trig.

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 1) From a boat on the lake, the angle of elevation to the top of a cliff is $12^{\circ}50'$. If the base of the cliff is 1366 feet from the boat, how high is the cliff (to the nearest foot)? 1) _____

- 2) When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is $38^{\circ}32'$. If Joey is known to be standing 39 feet from the base of the tree, how tall is the tree (to the nearest foot)? 2) _____

- 3) Bob is driving along a straight and level road straight toward a mountain. At some point on his trip he measures the angle of elevation to the top of the mountain and finds it to be $25^{\circ}17'$. He then drives 1 mile (1 mile = 5280 ft) more and measures the angle of elevation to be $31^{\circ}51'$. Find the height of the mountain to the nearest foot. 3) _____

- 4) A person is watching a car from the top of a building. The car is traveling on a straight road directly toward the building. When first noticed the angle of depression to the car is $22^{\circ}44'$. When the car stops, the angle of depression is $48^{\circ}36'$. The building is 260 feet tall. How far did the car travel from when it was first noticed until it stopped? Round your answer to the hundredths place. 4) _____

- 5) The number of hours of darkness in a coastal town can be modeled by 5) _____
 $f(x) = 6.1 \cos\left(\frac{\pi}{6}(x - 2)\right) + 12.1$, where x is the month and $x = 1$ corresponds to January.
 Approximate the number of hours of darkness in April, to the nearest tenth of an hour.
- 6) The position of a weight attached to a spring is $s(t) = -4 \cos 5t$. What are the frequency and 6) _____
 period of the system?
- 7) The position of a weight attached to a spring is $s(t) = -6 \cos 16\pi t$ inches after t seconds. 7) _____
 What is the maximum height that the weight reaches above the equilibrium position and
 when does it first reach the maximum height?
- 8) A Ferris wheel 50 feet in diameter makes one revolution every 40 seconds. The center of the 8) _____
 wheel is 30 feet above the ground. Write a cosine function to model the height of a car on
 the Ferris wheel at any time t .
- 9) A buoy oscillates up and down as waves go past. The buoy moves a total of 4.2 feet from 9) _____
 its low point to its high point, and moves from its low point to its high point every 10
 seconds. Write a cosine function modeling the buoy's vertical position at time t .
- 10) Low tide is at 11:15 am and high tide is at 5:15 pm. The water level varies 68 inches 10) _____
 between low and high tide. Write a cosine function to represent the change in water level.

11) For problems 11- 16, without using a calculator, find all solutions $[0, 2\pi)$.

11) _____

$$11) \sin x = -\frac{\sqrt{2}}{2}$$

$$12) \cos x = 1/2$$

12) _____

$$13) \tan x = -1$$

13) _____

$$14) \sec x = -2/\sqrt{3}$$

14) _____

$$15) \csc x = 2$$

15) _____

$$16) \cot x = -1$$

16) _____

Use your calculator to find all solutions in the interval $[0, 2\pi)$.

$$17) \sin x = 0.33$$

17) _____

$$18) \cos x = 0.59$$

18) _____

$$19) \tan x = 1.615$$

19) _____

$$20) \cos x = -0.36$$

20) _____

Find all solutions in the interval $[0, 2\pi)$ for each trigonometric equation.

$$21) 2\sin x + \sqrt{3} = 0$$

21) _____

22) $3 \tan x - \sqrt{3} = 0$

22) _____

23) $\cos x + \sqrt{2} = -\cos x$

23) _____

24) $4 \tan x = 3 + \tan x$

24) _____

25) $2 \cos x \sin x - \cos x = 0$

25) _____

26) $4 \cos^2 x - 1 = 0$

26) _____

27) $2 \sin^2 x + 3 \sin x + 1 = 0$

27) _____

28) $4 \cos^2 x - 4 \cos x + 1 = 0$

28) _____

29) $2 \sin^2 x - 3 \sin x = 2$

29) _____

30) $\tan x \sin^2 x = \tan x$

30) _____